

Application No. 10/727,472
Filed: December 4, 2003
TC Art Unit: 1775
Confirmation No.: 6264

IN THE CLAIMS

Please amend claims 1, 4, 6, 9, and 21 as shown in the Amendments to the Claims Section, infra. No new matter has been added. Additions are underlined and deleted matter is either contained between double brackets or struckthrough.

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AMENDMENTS TO THE CLAIMS

1. (Currently amended) A thermostructural composite structure having a ~~density~~compositional gradient, formed from a porous core made of a refractory having a pore volume content of greater than or equal to 80%, said core lying between two intermediate layers comprising part of the refractory of the porous core and, a ceramic phase and a refractory solid filler, and two external shells made of a ceramic covering said intermediate layers.
2. (Previously presented) The structure as claimed in claim 1, wherein the refractory of the porous core consists of a refractory fiber reinforcement consolidated by a matrix.
3. (Original) The structure as claimed in claim 2, wherein the reinforcement comprises carbon fibers of the ex-rayon type bonded together by a carbon matrix.
4. (Currently amended) The structure as claimed in claim 1, wherein the intermediate layers are anchored on and the porous core, on the one hand, and the ceramic shells and said intermediate layers, on the other, partly interpenetrate so as to anchor the intermediate layers in the porous core while and the ceramic shells are anchored on the intermediate layers.
5. (Previously presented) The structure as claimed in claim 1, which has a bulk density of less than 1.

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6. (Currently amended) The structure as claimed in claim 1, which includes a number of cavities having, the walls that of which form stiffeners.
7. (Original) The structure as claimed in claim 6, wherein the stiffeners have a wall thickness ranging up to 1 mm.
8. (Previously presented) The structure as claimed in claim 6, wherein the stiffeners have hollowed-out portions.
9. (Currently amended) The structure as claimed in claim 6, which includes at least one optical surface integrally formed with the stiffeners.
10. (Previously presented) The structure as claimed in claim 1, wherein the ceramic is composed of silicon carbide.
11. (Withdrawn) A process for manufacturing a laminated thermostructural composite structure having a compositional gradient, comprising the following steps:
- a) machining of a preform in a porous refractory component, the preform having a pore volume content of greater than or equal to 80%;
 - b) application of a liquid composition, containing a ceramic precursor polymer and a refractory solid filler, to all the accessible surfaces of the preform, crosslinking of the polymer and conversion of the crosslinked polymer into a ceramic by heat treatment in order to reduce the porosity at the surface of the preform; and

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c) formation of a ceramic coating by chemical vapor infiltration so as to form a ceramic shell over all the external surfaces of the preform.

12. (Withdrawn) The process as claimed in claim 11, wherein the preform is formed from a reinforcement of carbon fibers of the ex-rayon type, consolidated by a carbon matrix.

13. (Withdrawn) The process as claimed in claim 11, wherein step a) of machining the preform includes the hollowing-out of cavities in the component made of composite in order to form stiffeners.

14. (Withdrawn) The process as claimed in claim 13, wherein the step of machining the preform furthermore includes the formation of a substantially plane surface, said surface being polished after the chemical vapor infiltration step in order to form an optical surface.

15. (Withdrawn) The process as claimed in claim 11, wherein the liquid composition includes a solvent for the ceramic precursor polymer.

16. (Withdrawn) The process as claimed in claim 11, wherein the solid filler comprises at least one refractory powder whose mean particle size is less than 100 microns.

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17. (Withdrawn) The process as claimed in claim 16, wherein the mean particle size of the powder is between 5 microns and 50 microns.
18. (Withdrawn) The process as claimed in claim 11, wherein the solid filler comprises at least two powders of different mean particle sizes.
19. (Withdrawn) The process as claimed in claim 11, wherein the chemical vapor infiltration is carried out at a constant temperature.
20. (Withdrawn) The process as claimed in claim 11, wherein the coating formed by chemical vapor infiltration is of silicon carbide.
21. (Currently amended) The structure as claimed in claim 3, wherein:
the intermediate layers are anchored on ~~and the porous core, on the one hand,~~
~~and the ceramic shells and said intermediate layers, on the other, partly~~
~~interpenetrate so as to anchor the intermediate layers in the porous core~~ while ~~and the~~
ceramic shells are anchored on ~~in~~ the intermediate layers;
said structure has a bulk density of less than 1;
said structure includes a number of cavities having, the walls that ~~of which~~ form
stiffeners;
the stiffeners have a wall thickness ranging up to 1 mm;
the stiffeners have hollowed-out portions;
the ceramic shells are ~~is~~ composed of silicon carbide.

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22. (Previously presented) The structure as claimed in claim 7, which includes at least one optical surface integrally formed with the stiffeners.

23. (Withdrawn) The process as claimed in claim 12, wherein:

step a) of machining the preform includes the hollowing-out of cavities in the component made of composite in order to form stiffeners;

the step of machining the preform furthermore includes the formation of a substantially plane surface, said surface being polished after the chemical vapor infiltration step in order to form an optical surface;

the liquid composition includes a solvent for the ceramic precursor polymer;

the solid filler comprises at least one refractory powder whose mean particle size is less than 100 microns;

the mean particle size of the powder is between 5 microns and 50 microns;

the solid filler comprises at least two powders of different mean particle sizes;

the chemical vapor infiltration is carried out at a constant temperature;

the coating formed by chemical vapor infiltration is of silicon carbide.